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COUNTRY USSR

SUBJECT	Economic; Technological - Machine tools, high speed methods, ceramic cutting tools	DATE DIST	1 Apr 1953
HOW			

HOW PUBLISHED Daily newspapers and monthly periodicals

WHERE
PUBLISHED USSR

NO. OF PAGES 3

DATE
PUBLISHED Sep - 25 Dec 1952

LANGUAGE Russian

SUPPLEMENT TO
REPORT NO.

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HIGH-SPEED METHODS. NEW MACHINE TOOLS IN USSR

EXPLAINS SUPERHIGH-SPEED CUTTING METHODS -- Riga, Sovetskaya Latvija, 25 Dec 52

Comment: The following is a summary of an article written by E. Damberg, lathe operator at the Riga VEF Plant, describing his experience in achieving superhigh speeds in cutting metal. 7

Recently E. Damberg received an assignment to machine cast-iron gears 471 millimeters in diameter. He used type TM-332 ceramic cutters with a spindle speed of 3,000 revolutions per minute and feed of 0.6 millimeter per workpiece revolution. He achieved a cutting speed of 4,437 meters per minute.

He explains that ordinarily, in using VK-8 hard-alloy-tipped cutters, a cutting speed of only 160-200 meters per minute can be achieved.

He points out that to attain record speeds, it is first necessary to study relentlessly and to acquire important technical knowledge. Without this knowledge, successful work is impossible, he says, even at ordinary speeds. He goes on to say that he strived to master, to the point of perfection, the new Model 16-20 machine tool produced by the Krasny Proletary Plant. The range of speed on this lathe is from 18 to 3,000 revolutions per minute; the height of centers, 250 millimeters.

However, he adds, the matter of high speeds does not depend on the machine tool alone. He gives special attention to the grinding and finishing of cutting tools, proper organization of work area, and decreasing auxiliary time. In grinding ceramic blades, he imparts a positive angle of from $+2$ to $+6$ degrees. To strengthen the cutting edge, he puts a negative (otritsatel'nyy) face on the front edge of the cutter. He curves the angle at the cutting point to a radius of 0.5-1.0 millimeter. The curve gives a fine machined surface at superhigh speeds, he states.

He further emphasizes that increasing the cutting speed is not the only means of raising labor productivity in machining metal. There are many, one of which is increasing the feed of the cutter.

— 1 —

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Ordinarily, Damberg states, a high-speed lathe operator uses a feed of 0.25-0.5 millimeter per workpiece revolution. If the feed is increased to 2-3 millimeters, high productivity can be achieved even at low cutting speeds.

However, he says, with a large feed it is impossible to obtain a smooth surface finish. Since a finishing cut would then be necessary, it would nullify the advantage of the large feed.

He says he finally came to the conclusion that to obtain a good finish with the use of large feeds, a cutter must have a special shape.

After much trial and error, he succeeded in developing such a cutter. He describes it as not being especially intricate in shape. It is similar to the so-called recessing, form tool with positive angle and negative face on the cutting edge, 0.5-1.0 millimeter wide. Using this cutter in roughing a steel part, he succeeded in decreasing the machining time six times. This method is especially suitable in those cases where the design of the machine tool will not permit high speeds, he states.

Damberg then refers to a recent issue of Literaturnaya Gazeta in which an article by Vasily Kolesov, a lathe operator at the Kuybyshev Srednevolzhskiy Machine Tool Building Plant, describes a method of cutting metal with the use of a large feed. Damberg says that Kolesov has fittingly called this method the power (silovoy) method of cutting. It appears, says Damberg, that the problem on which he had been working for so long at VEF had been successfully solved and widely disseminated at the Kuybyshev Plant. He points out that this fact emphasizes the correctness of Kolesov's conclusion, namely, that technical information is poorly organized.

Damberg concludes that the next task in the field of increased labor productivity is to combine high-speed methods with power-cutting methods.

ACHIEVES CUTTING SPEED OF 3,410 METERS PER MINUTE WITH USE OF METAL-CERAMIC CUTTERS -- Moscow, Moskovskiy Komsomolets, 29 Oct 52

Sergey Bushuyev, a Stalin Prize winner, attained a cutting speed of 3,410 meters per minute in boring a pulley with metal-ceramic cutters. He achieved this speed at the laboratory of cutting at the Moscow Automobile Plant (Imeni Stalina) while operating a Model A16 20 machine tool produced by the Moscow Krasnyy Proletariy Plant.

FIRST HIGH-SPEED HORIZONTAL MILLING MACHINE -- Vil'nyus, Sovetskaya Litva, 2 Oct 52

On 1 October, the Vil'nyus Zhalgiris Machine Tool Building Plant completed the assembly of the first horizontal milling machine of a new model.

Paley, leading designer of this machine tool and associate of the Experimental Scientific Research Institute of Metal-Cutting Machine Tools, Ministry of Machine Tool Building USSR, and Gendov, electrical engineer at this institute, participated actively in the assembly of the milling machine.

Vil'nyus, Sovetskaya Litva, 2 Nov 52

In the past 4 years, the Vil'nyus Zhalgiris Plant has perfected three types of machine tools, the production of which has been expanded from year to year.

In 1952, the production of metal-cutting machine tools at the plant increased 4.5 times as compared with 1948.

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The plant recently manufactured the first high-speed horizontal milling machine. It was designed by Paley, engineer. Series production of these machine tools has now been started. - V. Goncharenko, director, Zhel'girsk Machine Tool Building Plant.

DESIGN FIRST BALANCING MACHINE FOR TURBINE PARTS -- Leningradskaya Pravda, 18 Dec 52

The Experimental Scientific Research Institute of Metal-Cutting Machine Tools has designed for the first time a machine for balancing rotating parts for steam turbines, turbogenerators, and other machines in which the unbalance of rotating parts can cause breakage. The machine can locate the unbalance of parts from several kilograms to 75 tons in weight. Priority in the delivery of these machines will be given to plants working for construction projects.

The Moscow Stankokonstruktziya Plant, which is an experimental base of the institute, has mastered the production of a new type of gear-hobbing machine. This machine tool, in contradistinction to foreign models, has been developed on a fundamentally new technical basis. It operates with hard-alloy cutters, as a result of which the cutting speed has been increased ten times and labor productivity has been increased 3-5 times. The introduction of this machine tool will save millions of rubles.

MAKE PRECISION GEAR-CUTTING SEMIAUTOMATIC -- Moscow, Vestnik Mashinostroyeniya, Sep 52

A small-module gear-cutting semiautomatic is being manufactured at the Leningrad Dividing Head Plant. It is intended for producing precision parts such as gears for watches.

MASTER PRODUCTION OF MEASURING MACHINES -- Minsk, Sovetskaya Belorussiya, 26 Oct 52

The Moscow Kalibr Plant has mastered the production of new checking and measuring automatics and longitudinal dividing machines which make it possible to measure to an accuracy of one tenth of a micron.

TEST MACHINE TOOLS FOR UNUSUAL PURPOSES -- Moscow, Vechernyaya Moskva, 13 Nov 52

The last plant tests of machine tools for unusual purposes are being made at the assembly shop of the Moscow Machine Tool Plant named Ordzhonikidze.

A long asbestos-cement pipe more than one meter in diameter is processed on one of the machines. It revolves smoothly on rollers. A special cutter cuts a large ring from the pipe, from which a tapered coupling is turned on another machine tool. Construction workers use these couplings when laying the pipes.

In addition to the cutting-off machine, six other new machine tools are being tested. These machine tools remind one of portable lathes. The surface of asbestos-cement pipes of average diameter is machined on them. They quickly remove a small layer from the surface of the pipes, bringing them to size.

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- 3 -

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